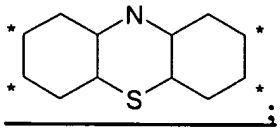
Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Currently Amended) A method of [^{11}C]-radiolabelling a phenothiazine compound ~~or a phenothiazine-like compound~~ , wherein:

said compound has a polycyclic core of ~~three six-membered rings fused together in a linear fashion and denoted the A-ring, B-ring, and C-ring, where the B-ring is the "middle" ring;~~ **the following formula:**

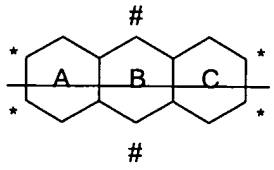


said polycyclic core is ~~partially-aromatic or~~ fully-aromatic;

~~said polycyclic core has 14 ring atoms, including exactly 1 or exactly 2 ring heteroatom(s), each of which is independently selected from N, O, and S;~~

~~the remainder of said ring atoms being C;~~

~~said exactly 1 or exactly 2 ring heteroatom(s) form part of the B-ring, but not part of the A-ring or C-ring, and so are located at one or both of the "central" positions denoted by a hash mark (#) in the following depiction of the polycyclic core:~~



said compound has a pendant group covalently attached **at one of the positions denoted by asterisks (*) in the above formula** ~~to a ring atom of said polycyclic core~~;

said pendant group is independently:

a primary amino group;

a cationic primary imino group;

a secondary amino group;

a cationic secondary imino group;

a primary imino group; or

a secondary imino group;

said method comprising the step of:

reacting said phenothiazine compound ~~or a phenothiazine-like compound~~ with [^{11}C]methyl trifluoromethanesulfonate ($CF_3SO_2O^{11}CH_3$);

thereby converting said pendant group to a corresponding [^{11}C]methyl-labelled pendant group, respectively:

a [^{11}C]methyl-labelled secondary amino group;

a [^{11}C]methyl-labelled cationic secondary imino group;

a [^{11}C]methyl-labelled tertiary amino group;

a [^{11}C]methyl-labelled cationic tertiary imino group;

a [^{11}C]methyl-labelled secondary imino group; or

a [^{11}C]methyl-labelled cationic tertiary imino group;

to give a [^{11}C]-radiolabelled phenothiazine ~~or phenothiazine-like~~ compound.

2.-68. (Canceled).

69. (Previously Presented) A method according to claim 1, wherein said pendant group is independently:

a secondary amino group or

a cationic secondary imino group;

and said corresponding [^{11}C]methyl-labelled pendant group, respectively, is:

a [^{11}C]methyl-labelled tertiary amino group; or

a [^{11}C]methyl-labelled cationic tertiary imino group.

70. (Previously Presented) A method according to claim 1, wherein said pendant group is independently selected from:

$-NH_2$, $-NHR$, $=N^{(+)}H_2$, $=N^{(+)}HR$, $=NH$, and $=NR$;

wherein R is independently selected from C_{1-6}alkyl, C_{1-6}alkenyl, C_{1-6}alkynyl, C_{1-6}cycloalkyl, and C_{1-6}cycloalkenyl, and is optionally substituted with one or more groups selected from fluoro, chloro, bromo, iodo, hydroxy, and C_{1-4}alkoxy;

and said corresponding [^{11}C]methyl-labelled pendant group, respectively, is:

$-NH-(^{11}CH_3)$, $-NR-(^{11}CH_3)$, $=N^{(+)}H-(^{11}CH_3)$, $=N^{(+)}R-(^{11}CH_3)$, or $=N-(^{11}CH_3)$.

71. (Previously Presented) A method according to claim 1, wherein said pendant group is independently selected from: $-NHR$ and $=N^{(+)}HR$;

wherein R is independently selected from C_{1-6}alkyl, C_{1-6}alkenyl, C_{1-6}alkynyl, C_{1-6}cycloalkyl, and C_{1-6}cycloalkenyl, and is optionally substituted with one or more groups selected from fluoro, chloro, bromo, iodo, hydroxy, and C_{1-4}alkoxy;

and said corresponding [^{11}C]methyl-labelled pendant group, respectively, is: $-NR-(^{11}CH_3)$ or $=N^{(+)}R-(^{11}CH_3)$.

72. (Previously Presented) A method according to claim 71, wherein R is independently C_{1-4} alkyl.

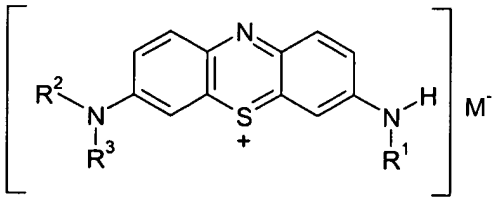
73. (Previously Presented) A method according to claim 71, wherein R is independently -Me or -Et.

74. (Previously Presented) A method according to claim 71, wherein R is independently -Me.

75. (Previously Presented) A method according to claim 1, wherein said compound has, in addition to said pendant group, one or more additional substituents selected from:

amino ($-NH_2$), methylamino (-NHMe), dimethylamino ($-NMe_2$), ethylamino (-NHEt), diethylamino ($-NEt_2$), imino (=NH), methylimino (=NMe), ethylimino (=NEt), methyl (-Me), ethyl (-Et), fluoro (-F), chloro (-Cl), bromo (-Br), iodo (-I), oxo (=O), hydroxy (-OH), carboxy (-COOH), and protonated and deprotonated forms thereof.

76. (Currently Amended) A method according to claim 1, wherein the phenothiazine ~~or phenothiazine-like~~ compound is a compound of the following formula:



wherein:

each of R^1, R^2, and R^3 is independently -H, C_{1-6}alkyl, C_{1-6}alkenyl, C_{1-6}alkynyl, C_{1-6}cycloalkyl, and C_{1-6}cycloalkenyl, and is optionally substituted with one or more groups selected from fluoro, chloro, bromo, iodo, hydroxy, and C_{1-4}alkoxy; and

M^- is an anion.

77. (Previously Presented) A method according to claim 76, wherein $-NHR^1$ is independently -NHMe.

78. (Previously Presented) A method according to claim 76, wherein $-NR^2R^3$ is independently $-NH_2$, -NHMe, or $-NMe_2$.

79. (Previously Presented) A method according to claim 77, wherein $-NR^2R^3$ is independently $-NH_2$, -NHMe, or $-NMe_2$.

80. (Previously Presented) A method according to claim 76, wherein $-NR^2R^3$ is independently $-NMe_2$.

81. (Previously Presented) A method according to claim 77, wherein $-NR^2R^3$ is independently $-NMe_2$.

82. (Previously Presented) A method according to claim 76, wherein M^- is independently a halide ion.

83. (Previously Presented) A method according to claim 77, wherein M^- is independently a halide ion.

84. (Previously Presented) A method according to claim 78, wherein M^- is independently a halide ion.

85. (Previously Presented) A method according to claim 76, wherein M^- is independently Cl^-.

86. (Previously Presented) A method according to claim 77, wherein M^- is independently Cl^-.

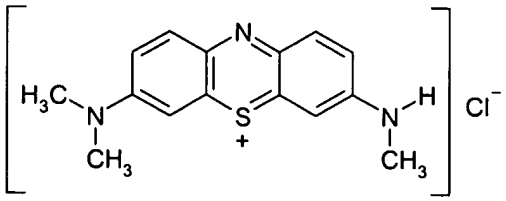
87. (Previously Presented) A method according to claim 78, wherein M^- is independently Cl^-.

88. (Previously Presented) A method according to claim 79, wherein M^- is independently Cl^-.

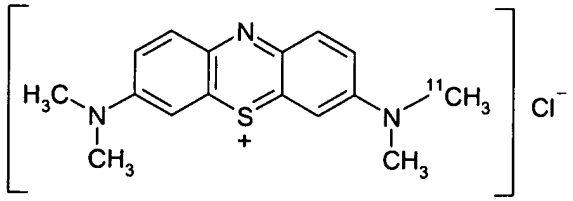
89. (Previously Presented) A method according to claim 80, wherein M^- is independently Cl^-.

90. (Previously Presented) A method according to claim 81, wherein M^- is independently Cl^-.

91. (Currently Amended) A method according to claim 1, wherein the phenothiazine ~~or phenothiazine-like~~ compound is Azure B:



and said [^{11}C]-radiolabelled phenothiazine ~~or phenothiazine-like~~ compound is [N-methyl-^{11}C]methylene blue:



92. (Previously Presented) A method according to claim 1, wherein said reaction is performed in the presence of a Bronsted base.

93. (Previously Presented) A method according to claim 1, wherein said reaction is performed in the presence of an alkali metal carbonate or bicarbonate.

94. (Previously Presented) A method according to claim 1, wherein said reaction is performed in the presence of potassium carbonate.

95. (Previously Presented) A method according to claim 1, wherein said reaction is carried out in aqueous media.

96. (Currently Amended) A method according to claim 1, wherein said reaction is carried out by introducing said [^{11}C]methyl trifluoromethanesulfonate into an aqueous solution or suspension of said phenothiazine ~~or phenothiazine-like~~ compound, to form a reaction mixture.

97. (Previously Presented) A method according to claim 96, wherein said aqueous solution or suspension further comprises a Bronsted base.

98. (Previously Presented) A method according to claim 96, wherein said aqueous solution or suspension further comprises an alkali metal carbonate or bicarbonate.

99. (Previously Presented) A method according to claim 96, wherein said aqueous solution or suspension further comprises potassium carbonate.

100. (Previously Presented) A method according to claim 96, wherein said reaction mixture is mixed for a mixing time of 1-30 minutes.

101. (Previously Presented) A method according to claim 96, wherein said reaction mixture is mixed for a mixing time of 1-10 minutes.

102. (Previously Presented) A method according to claim 96, wherein said reaction is carried out at 20°C-25°C.

103. (Previously Presented) A method according to claim 96, wherein said reaction is carried out under an inert atmosphere.

104. (Previously Presented) A method according to claim 96, wherein said reaction is carried out under argon.

105. (Currently Amended) A method according to claim 1, further comprising the subsequent step of:

purifying said [^{11}C]-radiolabelled phenothiazine ~~or phenothiazine-like~~ compound.

106. (Currently Amended) A method according to claim 1, further comprising the subsequent step of:

purifying said [^{11}C]-radiolabelled phenothiazine ~~or phenothiazine-like~~ compound using ion exchange methods.

107. (Currently Amended) A method according to claim 1, further comprising the subsequent step of:

purifying said [^{11}C]-radiolabelled phenothiazine ~~or phenothiazine-like~~ compound using cation exchange methods.

108. (Previously Presented) A method according to claim 1, wherein the reaction and optional purification is performed in less than 60 minutes.

109. (Previously Presented) A method according to claim 1, wherein the reaction and optional purification is performed in less than 45 minutes.

110. (Previously Presented) A method according to claim 1, wherein the reaction and optional purification is performed in less than 40 minutes.

111. (Previously Presented) A method according to claim 1, which provides a radiochemical purity greater than 90%.

112. (Previously Presented) A method according to claim 1, which provides a radiochemical yield of at least 2%.

113. (Previously Presented) A method according to claim 1, which provides a specific average activity of at least 0.5 GBq/μmol.

114. (Previously Presented) A method according to claim 1, which is partially or fully automated.

115.- 125. (Canceled).